SMD High Power LED (high power LEDs) - NO: H2.4.1- 8541401000HP041 SPECIFICATION FOR APPROVALFOR APPROVAL

P***LEDs & color LEDs

Guangdong Queendom Group Technology Co., Ltd.

TEL：0769-81305858 81305868
www.cn-led.net gm@cn-led.net

No. 39, Wanjiang Section, Guansui Road, Wanjiang Street, Dongguan City, Guangdong Province

Postcode 523800

Features:

Emission color: IngaN AlGaInP

Lens appearance: Red, orange, yellow, common green, emerald green, blue

Multi-color type.

Applicable to all SMT assembly methods.

Compatible with infrared and vapor phase reflow soldering processes.

Compatible with automatic placement equipment.

Descriptions:

high power LEDs is a high power package that provides high luminance

from a super robust package to enable cost effective and reliable fixture, high power LEDs uses an industry standard high power LEDs surface mount package with a fairly small Light Emitting Surface (LES).

Queendom high power LEDs Red, orange, yellow, common green, emerald green, blueand offers hot-color targeting to ensure that the LEDs are within color target at application

conditions of 85°C. Futhermore, with the latest Queendom Technology,

Applications:

Automobile: dashboard, brake lights, turn signals.

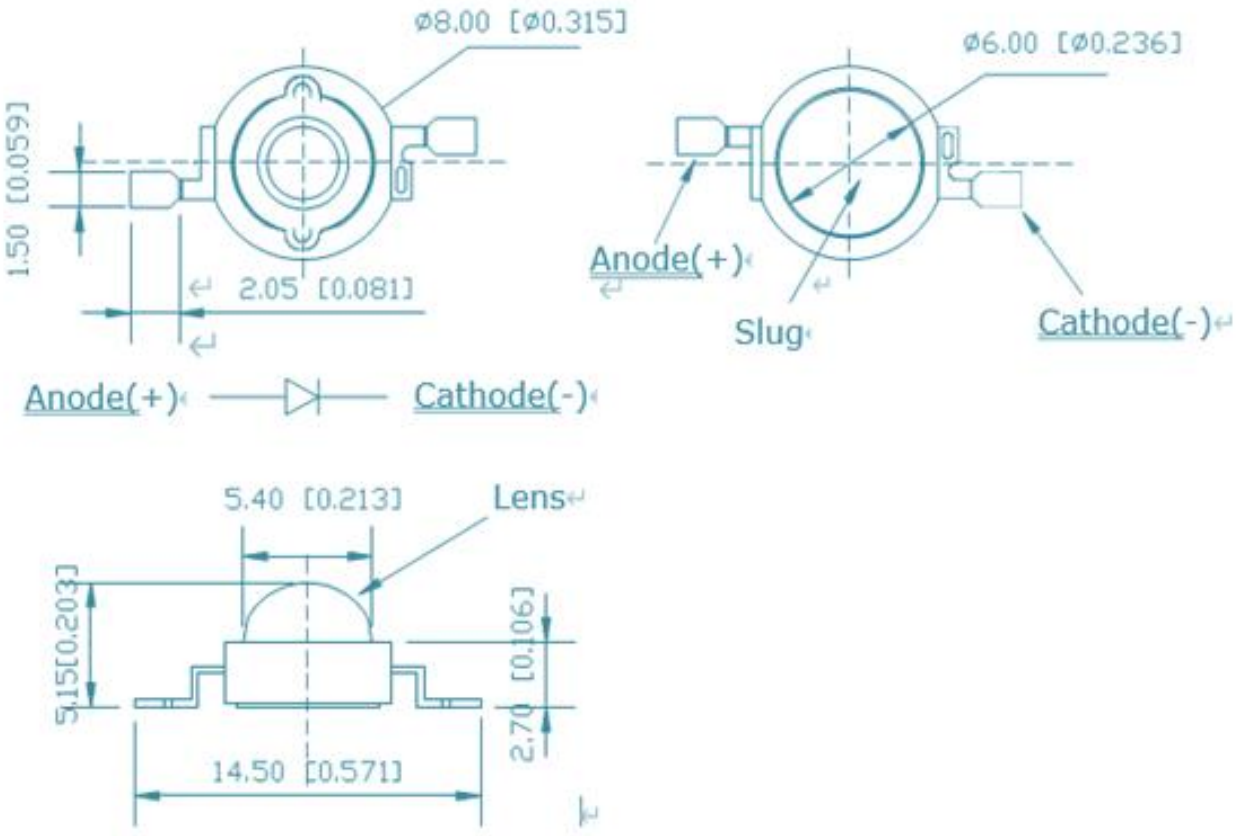
Biomedical optics, instrument and equipment testing

Status indicator: consumer electronics and industrial electronics.

Security, infrared monitoring, night vision

Package SIZE:

Picture 1



Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (.010″) unless otherwise noted.
3. Protruded resin under flange is 1.00mm (.039″) max.

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Absolute Maximum Ratings

Table 1. Absolute maximum ratings for Queendom LEDs.

PARAMETER	RED \ ORANGE \ YELLOW\ GENERAL GREEN	GREEN AND BLUE
Parameter PD (mW)	2800	3000
DC Forward Current [1, 2]	350mA	350mA
Peak Pulsed Forward Current [1, 3]	400mA	420mA
LED Junction Temperature [1] (DC & Pulse)	135°C	135°C
Reverse Voltage ($V_{reverse}$)	5	
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3	
LED Storage Temperature	-40°C to 80°C	
Operating Temperature Range	Minus 40°C To plus 80°C	
Soldering Temperature	JEDEC 020c 260°C	
Allowable Reflow Cycles	3~5 Seconds	
ESD Sensitivity	2000V HBM	

Notes for Table 1:

1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. Single-color light.
3. At 0.01ms pulse on time test with a pulse period of 0.1ms.
4.

Performance Characteristics

& Product Selection Guide

Table 2 . Product performance of Queendom high power color LEDs at rated current, T_j=25°C .

PRODUCT	FORWARD VOLTAGE	TYPICAL PEAK	TYPICAL POWER	WAVELENGTH		TYPICAL FLUX		MINIMUM EFFICACY	TYPICAL DEG	TEST CURRENT
				[3] NOMINAL λd.		[4] (lm)				
	(VF/V)	[1] CCT/K	[2] W	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	(lm/W)	2Θ 1/2	(mA)
PB52WE	3V	460	1	460	470	25	55	25	120	300
PB62WE	3V	470	1	470	480	25	55	25	120	300
PG02WE	3V	500	1	500	510	70	100	70	120	300
PG12WE	3V	510	1	510	520	90	120	90	120	300
PG22WE	3V	520	1	520	530	90	120	90	120	300
PG32WE	3V	530	1	530	540	85	115	85	120	300
PY22WE	2V	585	1	585	595	35	65	35	120	300
PAO2WE	2V	605	1	600	610	35	65	35	120	300
PR22WE	2V	620	1	610	630	35	65	35	120	300
PR32WE	2V	630	1	620	640	35	65	35	120	300
PR42WE	2V	640	1	640	660	35	65	35	120	300
PB52WF	3V	460	3	460	470	75	105	25	120	700
PB62WF	3V	470	3	470	480	75	105	25	120	700
PG02WF	3V	500	3	500	510	210	240	70	120	700
PG12WF	3V	510	3	510	520	270	300	90	120	700
PG22WF	3V	520	3	520	530	270	300	90	120	700
PG32WF	3V	530	3	530	540	255	285	85	120	700
PY22WF	2V	585	3	585	595	105	135	35	120	700
PAO2WF	2V	605	3	600	610	105	135	35	120	700
PR22WF	2V	620	3	610	630	105	135	35	120	700
PR32WF	2V	630	3	620	640	105	135	35	120	700
PR42WF	2V	640	3	640	660	105	135	35	120	700

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Product model code corresponding SKU table

Table 3 . Product performance of Queendom high power color LEDs at rated current, T_j=25°C .

PRODUCT	TYPICAL PEAK	WAVELENGTH		TEST CURRENT	PART NUMBER
		[3] NOMINAL λd.			
	[1] CCT/K	MINIMUM	MAXIMUM	(mA)	
PB52WE	460	460	470	300	8541401000HP0417
PB62WE	470	470	480	300	8541401000HP0418
PG02WE	500	500	510	300	8541401000HP0419
PG12WE	510	510	520	300	8541401000HP0420
PG22WE	520	520	530	300	8541401000HP0421
PG32WE	530	530	540	300	8541401000HP0422
PY22WE	585	585	595	300	8541401000HP0423
PAO2WE	605	600	610	300	8541401000HP0424
PR22WE	620	610	630	300	8541401000HP0425
PR32WE	630	620	640	300	8541401000HP0426
PR42WE	640	640	660	300	8541401000HP0427
PB52WF	460	460	470	700	8541401000HP0428
PB62WF	470	470	480	700	8541401000HP0429
PG02WF	500	500	510	700	8541401000HP0430
PG12WF	510	510	520	700	8541401000HP0431
PG22WF	520	520	530	700	8541401000HP0432
PG32WF	530	530	540	700	8541401000HP0433
PY22WF	585	585	595	700	8541401000HP0434
PAO2WF	605	600	610	700	8541401000HP0435
PR22WF	620	610	630	700	8541401000HP0436
PR32WF	630	620	640	700	8541401000HP0437
PR42WF	640	640	660	700	8541401000HP0438

Optical Characteristics

Table 4. Optical characteristics for QUEENDOM high power color LEDs at 350mA, Tj=25°C.

PRODUCT	COLOR	TYPICAL SPECTRAL HALF-WIDTH [1] (nm)	TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT WAVELENGTH (nm/°C)	TYPICAL VIEWING ANGLE [2]	PART NUMBER
P***LEDs ***-	Blue	20	0.03	135°	8541401000HP04
	Green	30	0.01	135°	
	Green	30	0.01	135°	
	Green	30	0.01	135°	
	Yellow	40	0.02	135°	
	Red	20	0.06	135°	
	Red	20	0.06	135°	
	Red	20	0.06	135°	

Notes for Table 2:
1. Spectral half-width is the spectral bandwidth at 50% of the peak intensity.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

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Electrical and Thermal Characteristics

Table 5. Optical characteristics for QUEENDOM high power color LEDs at 350mA, Tj=25°C.

PRODUCT	COLOR	FORWARD VOLTAGE [1] (Vf)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE— JUNCTION TO SOLDER PAD (°C/W)
		MINIMUM	TYPICAL	MAXIMUM		
P***LEDs ***--	Blue	2.5	3	3.5	-2.6	2.8
	Green	2.5	3	3.5	-2.4	3.5
	Green	2.5	3	3.5	-2.4	3.5
	Green	2.5	3	3.5	-2.4	3.5
	Yellow	1.5	2	2.5	-1.7	3
	Red	1.5	2	2.5	-1.7	2.8
	Red	1.5	2	2.5	-1.7	2.8
	Red	1.5	2	2.5	-1.7	2.8

Electrical and Thermal Characteristics

Table 6 . Product performance of Queendom high power color LEDs **at rated current, T_j=25°C .**

PRODUCT	TYPICAL PEAK	TYPICAL POWER	TYPICAL FLUX		MINIMUM EFFICACY	TEST CURRENT
			[4] (lm)			
	[1] CCT/K	[2] W	MINIMUM	MAXIMUM	(lm/W)	(mA)
PB52WE	460	1	25	55	25	300
PB62WE	470	1	25	55	25	300
PG02WE	500	1	70	100	70	300
PG12WE	510	1	90	120	90	300
PG22WE	520	1	90	120	90	300
PG32WE	530	1	85	115	85	300
PY22WE	585	1	35	65	35	300
PAO2WE	605	1	35	65	35	300
PR22WE	620	1	35	65	35	300
PR32WE	630	1	35	65	35	300
PR42WE	640	1	35	65	35	300
PB52WF	460	3	75	105	25	700
PB62WF	470	3	75	105	25	700
PG02WF	500	3	210	240	70	700
PG12WF	510	3	270	300	90	700
PG22WF	520	3	270	300	90	700
PG32WF	530	3	255	285	85	700
PY22WF	585	3	105	135	35	700
PAO2WF	605	3	105	135	35	700
PR22WF	620	3	105	135	35	700
PR32WF	630	3	105	135	35	700
PR42WF	640	3	105	135	35	700

Notes for Table 1: continued on next page
Queendom leds maintains a tolerance of ±1nm on dominant wavelength measurements.
Queendom leds maintains a tolerance of ±10% on luminous intensity measurements.
Correlated color temperature is hot targeted at Tj=85°C.
Queendom flux and CRI are based upon mounted package on highly reflective surface at Tj=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
Queendom maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.

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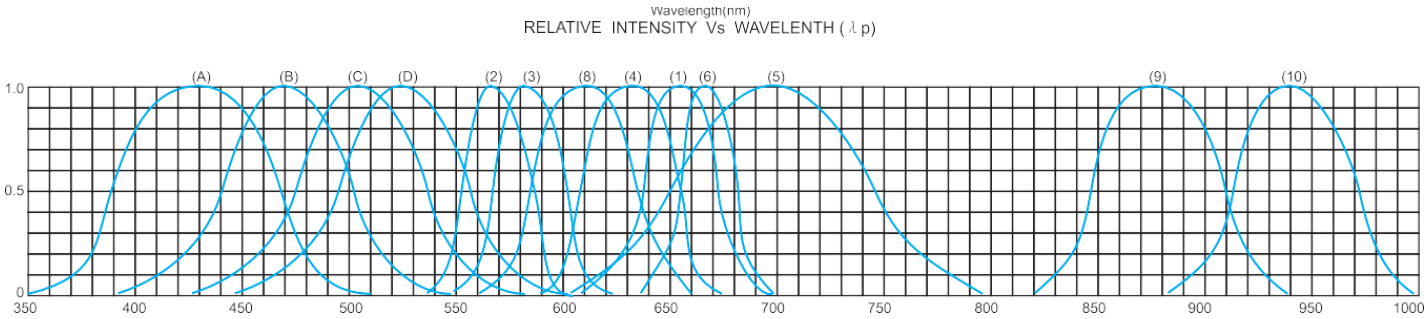
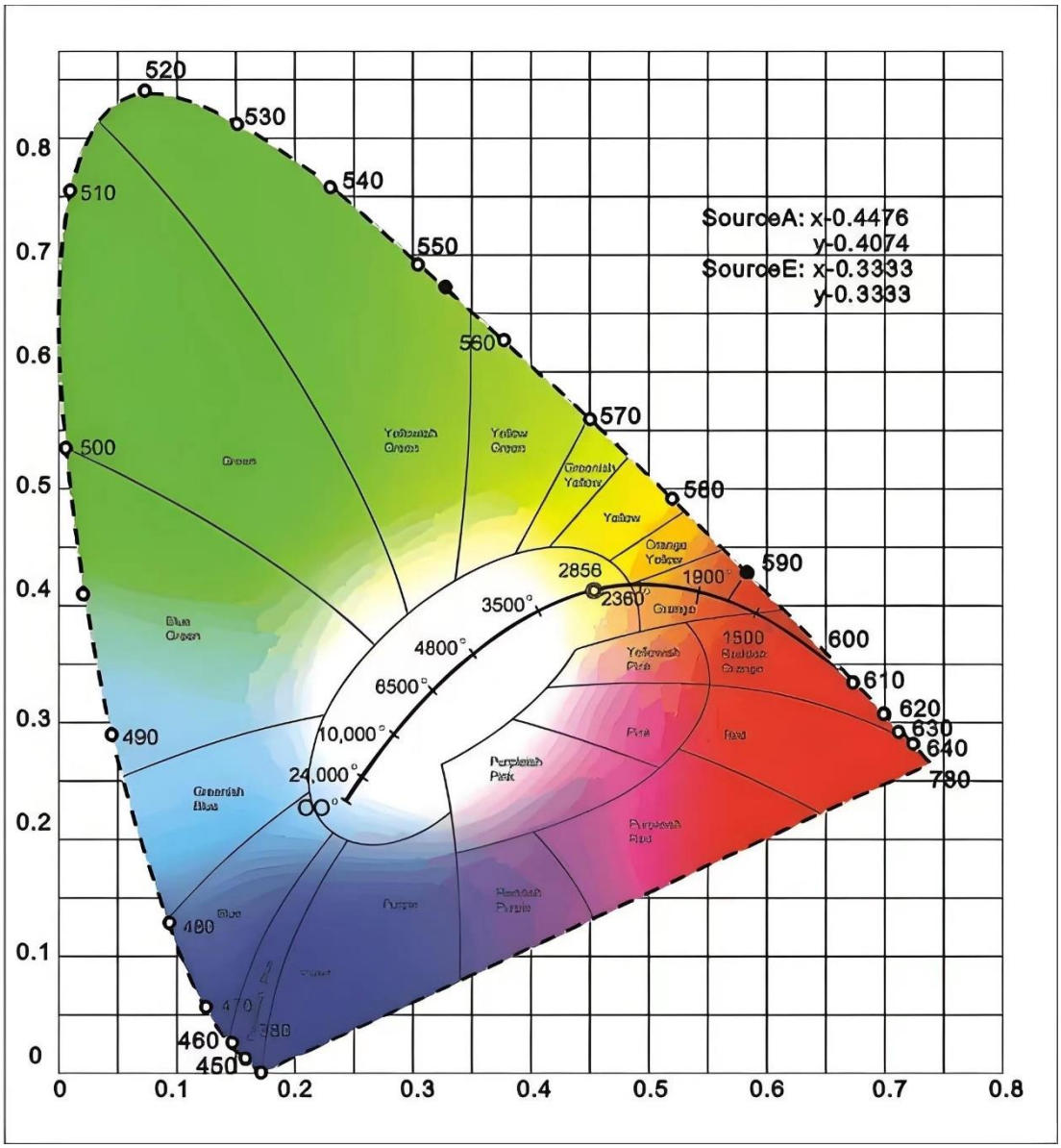
Characteristic Curves

Spectral Power DistributionCharacteristics

Figure 1. Typical wavelength for QUEENDOM LEDs, Tj=25°C.



(1) wGaAsP/GaAs 655nm/Red
(2) wGaP 568nm/Yellow Green
(3) wGaAsP/GaP 585nm/Yellow
(4) wGaAsP/GaP 635nm/Orange & Hi-Eff Red
(5) wGaP 700nm/Bright Red
(6) wGaAlAs/GaAs 660nm/Super Red
(7) wGaAsP/GaP 610nm/Super Red
(8) GaAlAs 880nm
(9) GaAs/GaAs & GaAlAs/GaAs 940nm
(A) GaN/SiC 430nm/Blue
(B) InGaN/SiC 470nm/Blue
(C) InGaN/SiC 502nm/Ultra Green
(D) InGaAl/SiC 523nm/Ultra Green



Characteristic Curves & Spectral Power DistributionCharacteristics

Typical Electrical / Optical Characteristics Curves (25℃ Ambient Temperature Unless Otherwise Noted)

Spectral Power DistributionCharacteristics

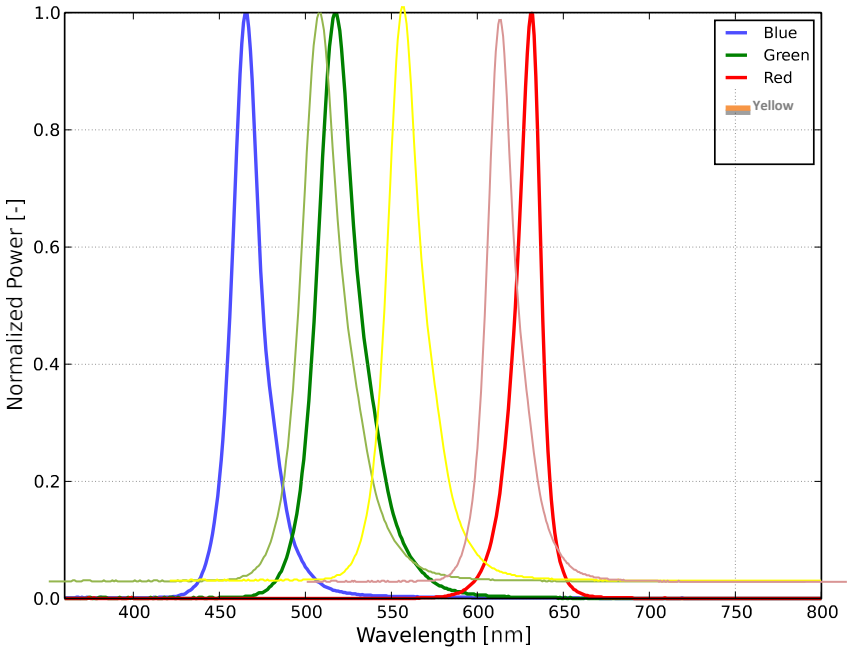


Figure 1. Typical normalized power vs. wavelength for Queendom led at 350mA, T_j=25°C.

Light Output Characteristics

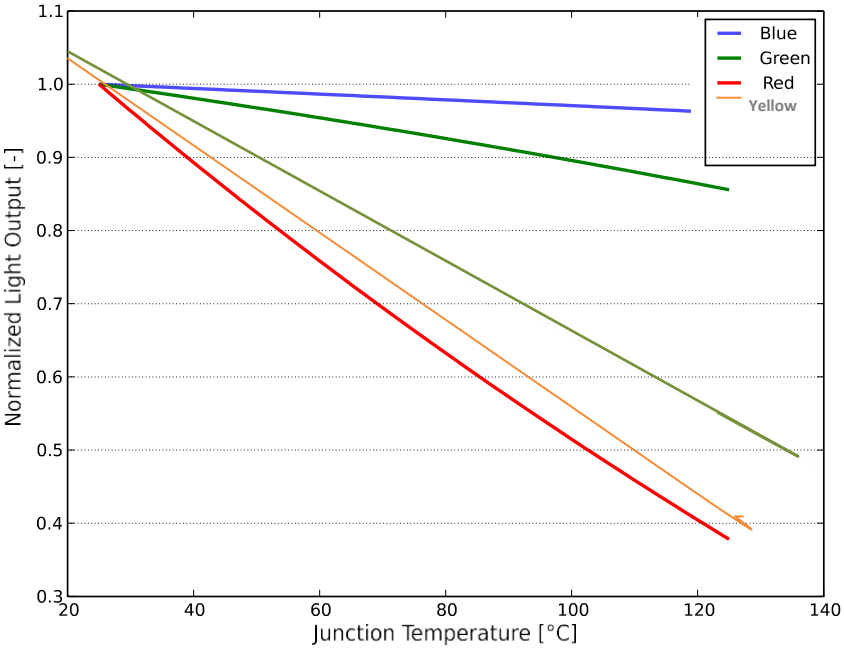


Figure 2. Typical normalized light output vs. junction temperature for Queendom LED at 350mA.

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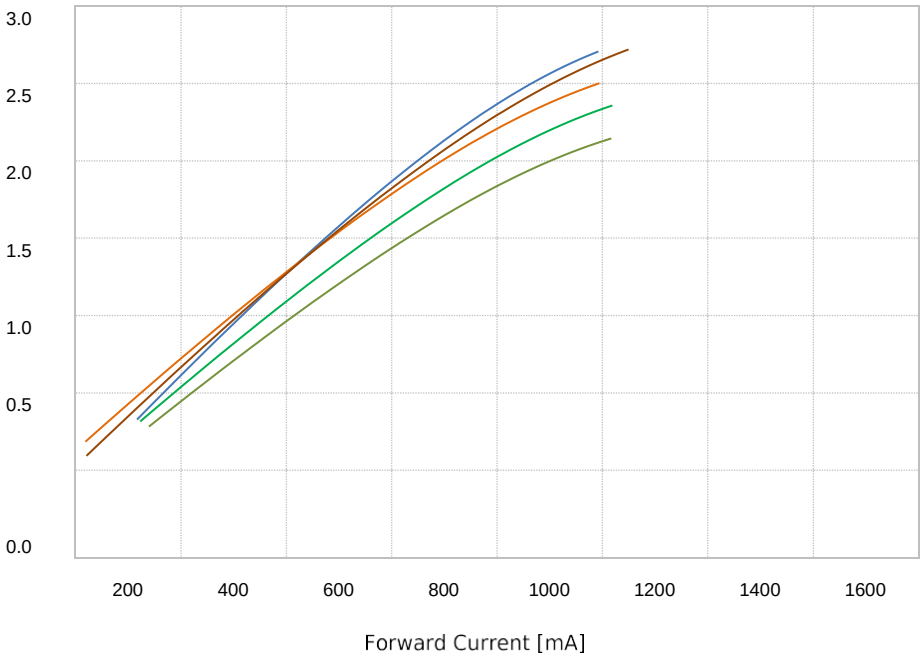
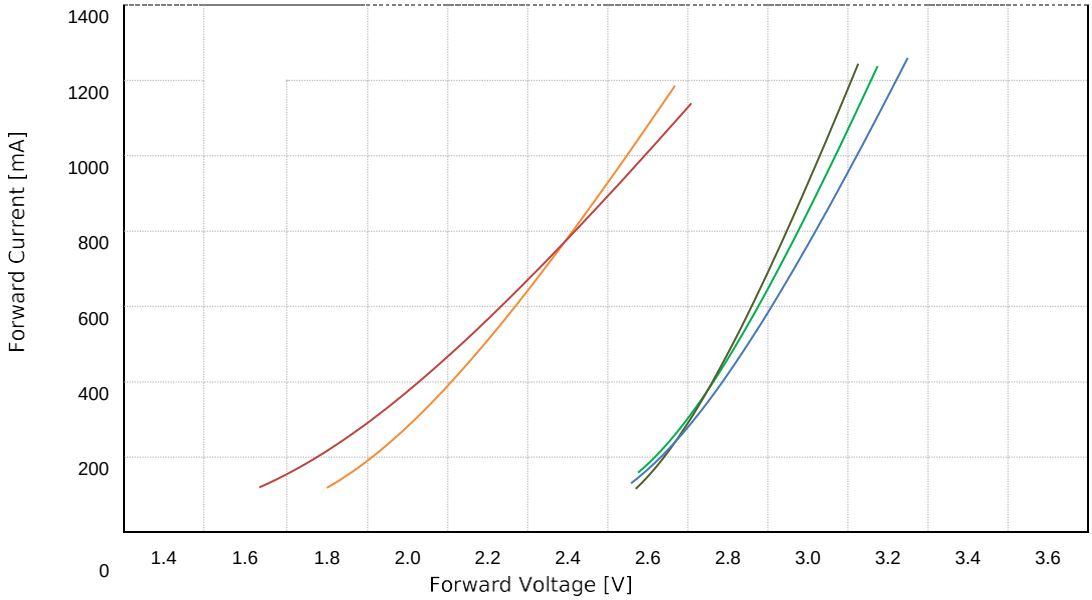
Light Output Characteristics



Typical normalized radiant power vs. forward current for Queendom LED at Tj=85°C .

Forward Current Characteristics



Typical forward current vs. forward voltage for Queendom LED at Tj=85°C .

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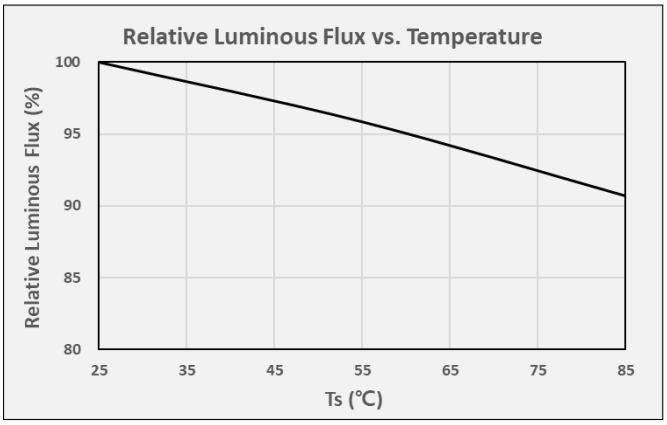
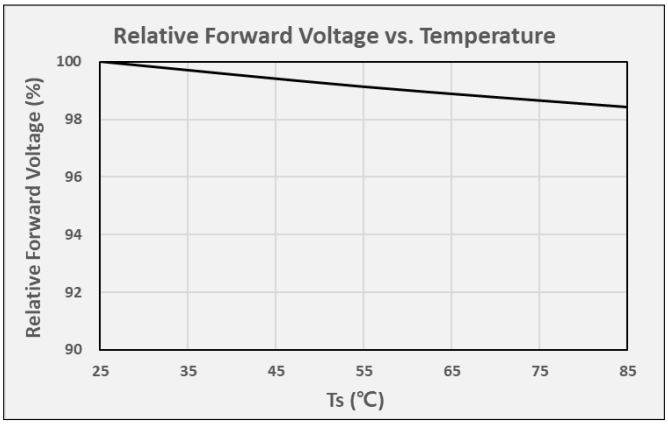
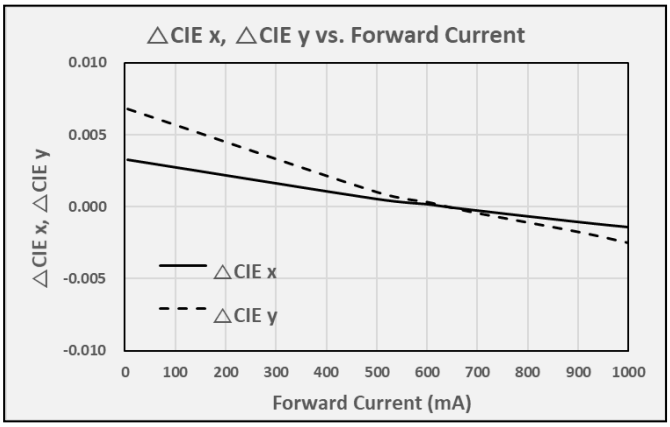
Typical Electrical / Optical Characteristics Curves (25℃ Ambient Temperature Unless Otherwise Noted)

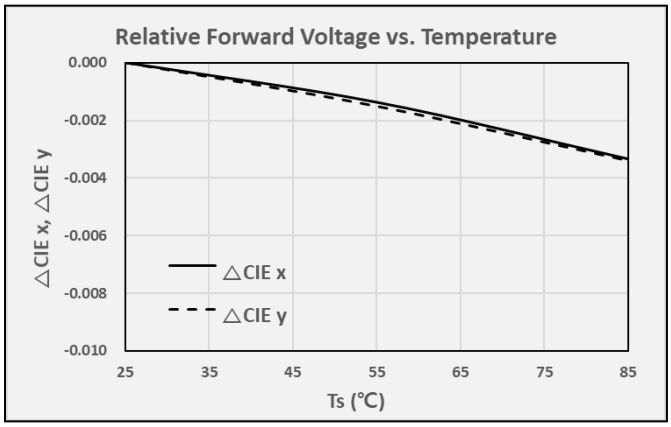
C)Temperature Characteristics **(25℃ Ambient Temperature Unless Otherwise Noted)**



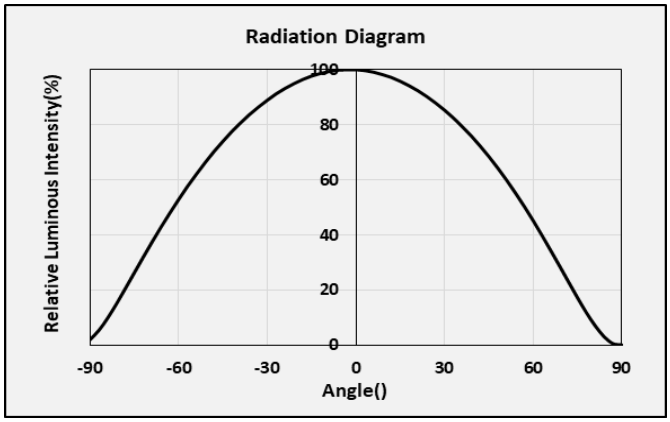


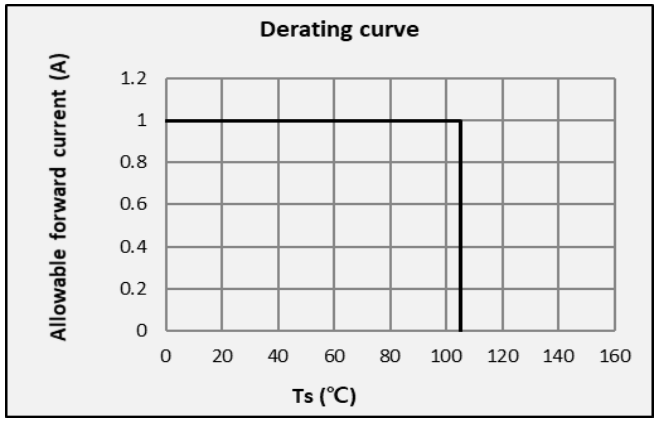
D) Color Shift Characteristics **(25℃ Ambient Temperature Unless Otherwise Noted)**





E)Beam Angle Characteristics (IF = 350 mA, Tj = 25℃)





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Radiation Pattern Characteristics

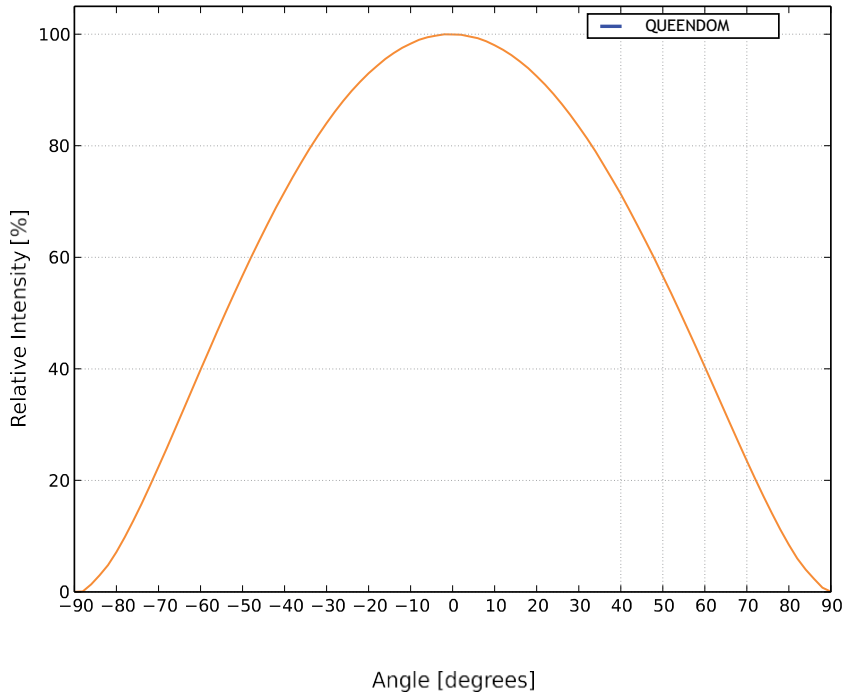
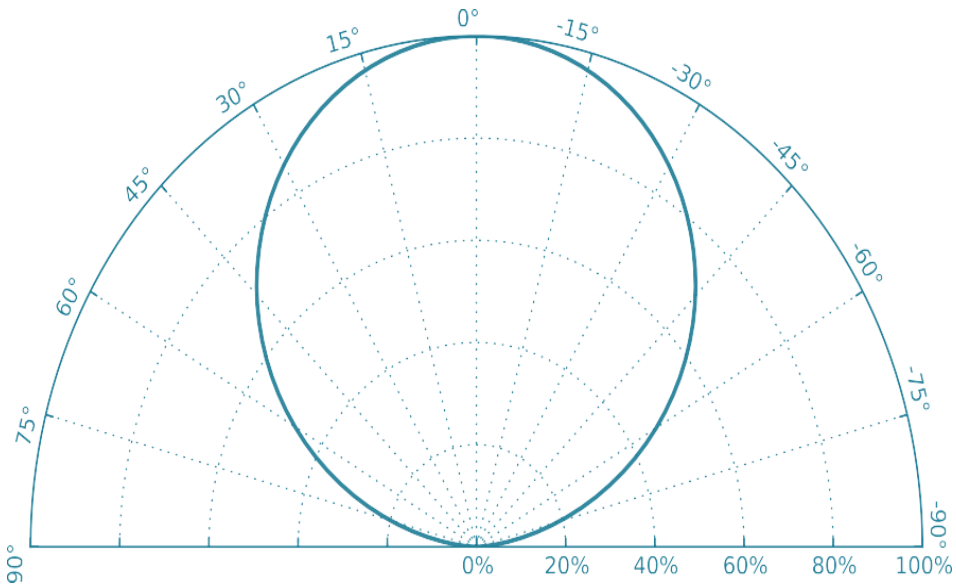


Figure 5. Typical radiation pattern for Queendom LED, T_j=25°C.



Product Bin and Labeling Definitions

Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheet. For this reason, Queendom leds bins LED components for luminous flux, intensity, radiometric power, color point, peak wavelength, dominant wavelength and forward voltage.

RANK NOMINAL CCT & COLOR COORDINATES

Chromaticity Region & Coordinates

Table 1. Electrical and thermal characteristics for Queendom at specified test current, Tj=25°C

PRODUCT	COLOR	BIN	DOMINANT WAVELENGTH [1] (nm)		RANK WAVELENGTH [2] (nm	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
3535 LEDS	Blue	B4D	459	465	2.5	5
		B5E	465	470	2.5	5
		B6F	470	475	2.5	5
		B6G	475	478	2.5	5
	Green	G0A	500	505	2.5	5
		G0B	505	510	2.5	5
		G1A	510	515	2.5	5
		G1B	515	520	2.5	5
	Green	G2C	520	525	2.5	5
		G2D	525	530	2.5	5
		G3E	530	535	2.5	5
		G5A	550	555	2.5	5
		G5B	555	560	2.5	5
	Green	G6A	560	565	2.5	5
		G6B	565	570	2.5	5
		Y1A	570	575	2.5	5
	Yellow	Y1B	575	580	2.5	5
		Y2A	580	585	2.5	5
	Orange	A0A	600	605	2.5	5
		A0B	605	610	2.5	5
		R1A	610	615	2.5	5
		R1V	615	619	2.5	5
	Red	R2A	619	624	2.5	5
		R2B	624	627	2.5	5
		R2C	627	630	2.5	5
		R3A	630	635	2.5	5
		R3B	635	640	2.5	5
		R4A	640	645	2.5	5
		R4B	645	650	2.5	5

Notes:
1. The tolerance of luminous intensity (Iv)is ±15％.
2. The tolerance of dominant wavelength is ±1nm.
3. This specification is preliminary.
4.This specification is a standard specification of our factory, can make in accordance with customer's special requirement.

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LUMINOUS FLUX BINS

Table 2.Luminous flux bin definitions for QUEENDOM Color Line at Tj=25°C.

BIN	QUEENDOM FLUX [1] (lm)		RANK FLUX [2] (lm)		TYPICAL FLUX HALF WIDTH
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	[3] (lm)
LW	95	100	3	5	5
LX	110	120	5	10	10
LY	130	140	5	10	10
LZ	150	160	5	10	10
H1	170	180	5	10	10
H2	190	200	5	10	10
H3	200	240	5	10	10
H4	240	280	20	40	40
H5	280	320	20	40	40
H6	320	360	20	40	40
H7	360	400	20	40	40
H8	400	440	20	40	40
H9	480	560	20	80	80
H10	560	640	20	80	80
H11	640	720	20	80	80
H12	720	800	20	80	80
H13	800	880	20	80	80
H14	880	960	20	80	80
H15	960	1040	20	80	80
H16	1060	1160	20	100	100
H17	1160	1260	20	100	100
H18	1260	1360	20	100	100
H19	1360	1460	20	100	100
H20	1460	1560	20	100	100
H21	1560	1660	20	100	100

TABLE Forward Voltage BINS

Table 3. Electrical and thermal characteristics for Queendom at specified test current, Tj=25°C

NUMBER	FORWARD VOLTAGE [1] (Vf)			RANK WAVELENGTH [2] (Vf)		TYPICAL VOLTAGE HALF WIDTH
	MINIMUM	TYPICAL	MAXIMUM	MINIMUM	MAXIMUM	[3] (Vf)
V1	1	1.2	1.4	0.1	0.2	0.2
V2	1.4	1.6	1.8	0.1	0.2	0.2
V3	1.8	2	2.2	0.1	0.2	0.2
V4	2.2	2.4	2.6	0.1	0.2	0.2
V5	2.6	2.8	3	0.1	0.2	0.2
V6	3	3.2	3.4	0.1	0.2	0.2
V7	3.4	3.6	3.8	0.1	0.2	0.2
V8	3.8	4	4.2	0.1	0.2	0.2
V9	4.2	4.4	4.6	0.1	0.2	0.2
VA	4.6	4.8	5	0.1	0.2	0.2
VB	5	5.2	5.4	0.1	0.2	0.2
VC	5.4	5.6	5.8	0.1	0.2	0.2
VD	5.8	6				
VE	6	7	8	1	2	2
VF	8	9	10	1	2	2
VG	10	11	12	1	2	2
VH	12	13	14	1	2	2

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TABLE TYPICAL POWER BINS

Table 4. Electrical and thermal characteristics for Queendom at specified test current, Tj=25°C

RANK NO.	TYPICAL POWER RANK (W) [1]		RANK POWER [2] (W)		TYPICAL POWER HALF WIDTH
	min	max	MINIMUM	MAXIMUM	[3] (W)
WE	1	3	1	3	3
WF	3	6	1	3	3
WG	6	9	1	3	3
WH	9	12	1	3	3
WI	12	15	1	3	3
WJ	15	18	1	3	3
WK	18	21	1	3	3
WL	21	24	1	3	3
WM	24	27	1	3	3
WN	27	30	2	3	3
WO	30	34	2	4	4
WP	34	38	2	4	4
WQ	38	42	2	4	4

s.

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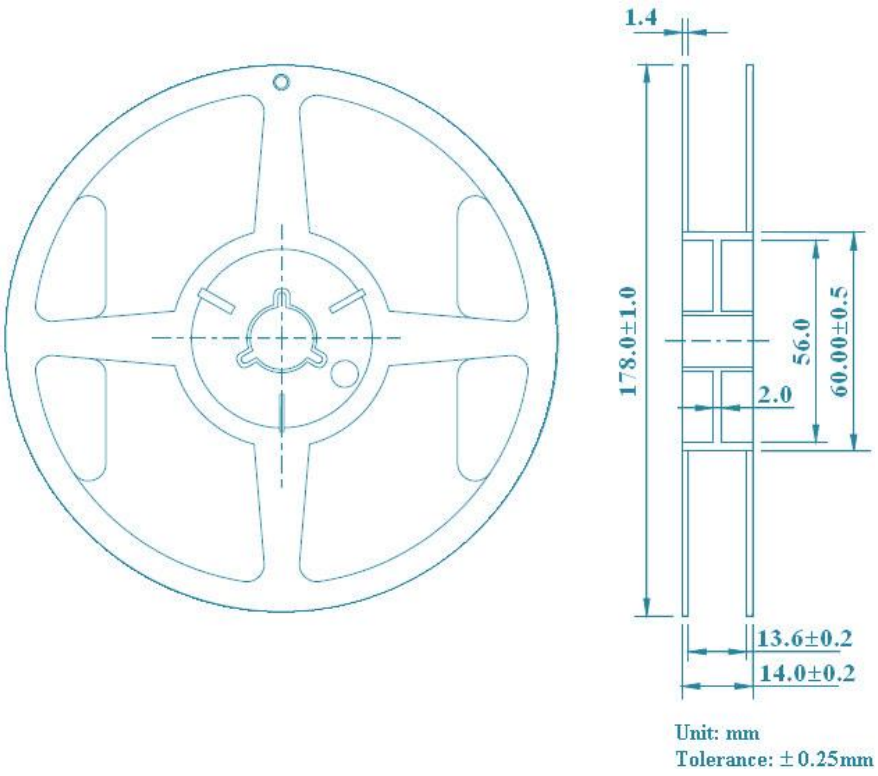
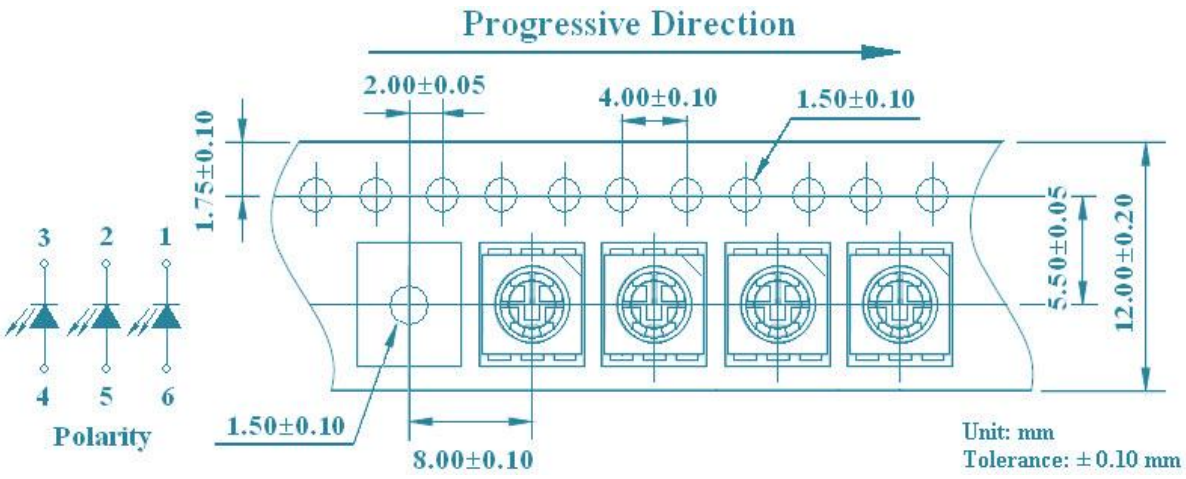
Packaging Information

Reel Dimensions:



Carrier Tape Dimensions:



Packing Quantity

1. 1000 PCS/1 Bag,
2. 10 Inner Cartons/1 Outside Carton

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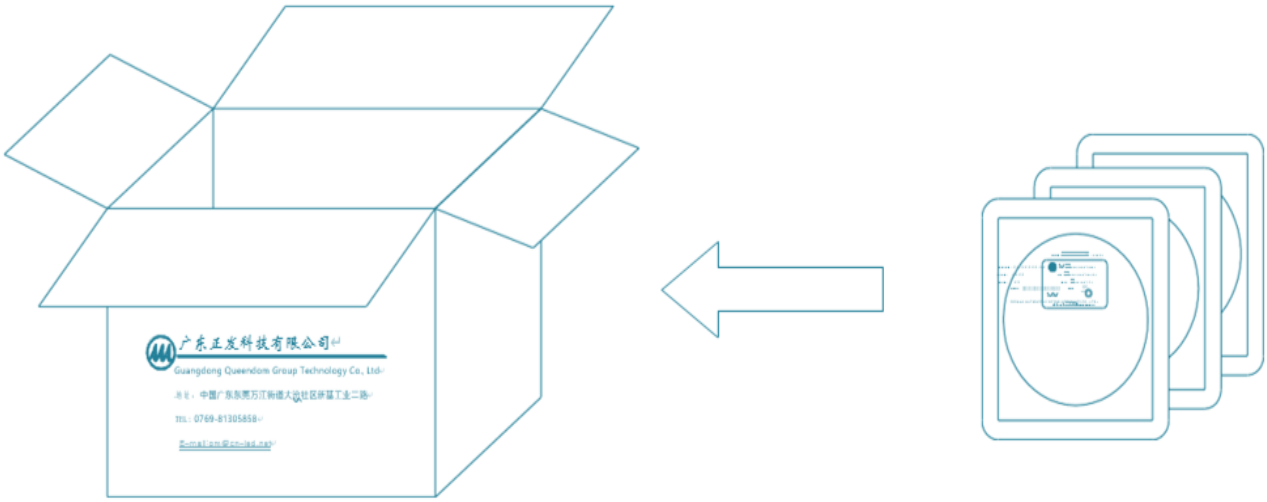
Packaging cartons



Information

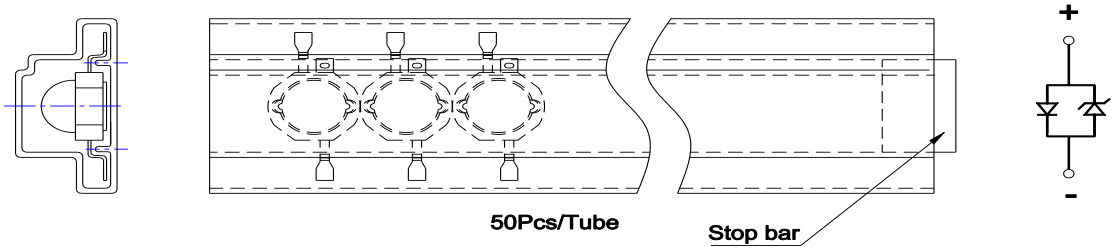
- With Stopper

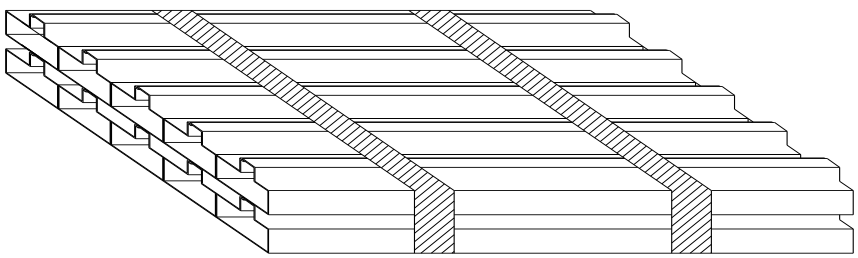
Without Stopper

CPN:Customer's Product Number
P/N:Product Number
QTY:Packing Quantity
LOT NO:Lot Number
VF:Forward Voltage Rank
IV:Luminous Intensity Rank
WLD:Dom. Wavelength Rank
BIN:BIN Code
DATE:Date Of Dispatch

Packing Quantity

1. 100 PCS/1 Bag,
2. 10 Inner Cartons/1 Outside Carton





10Tube/Bar

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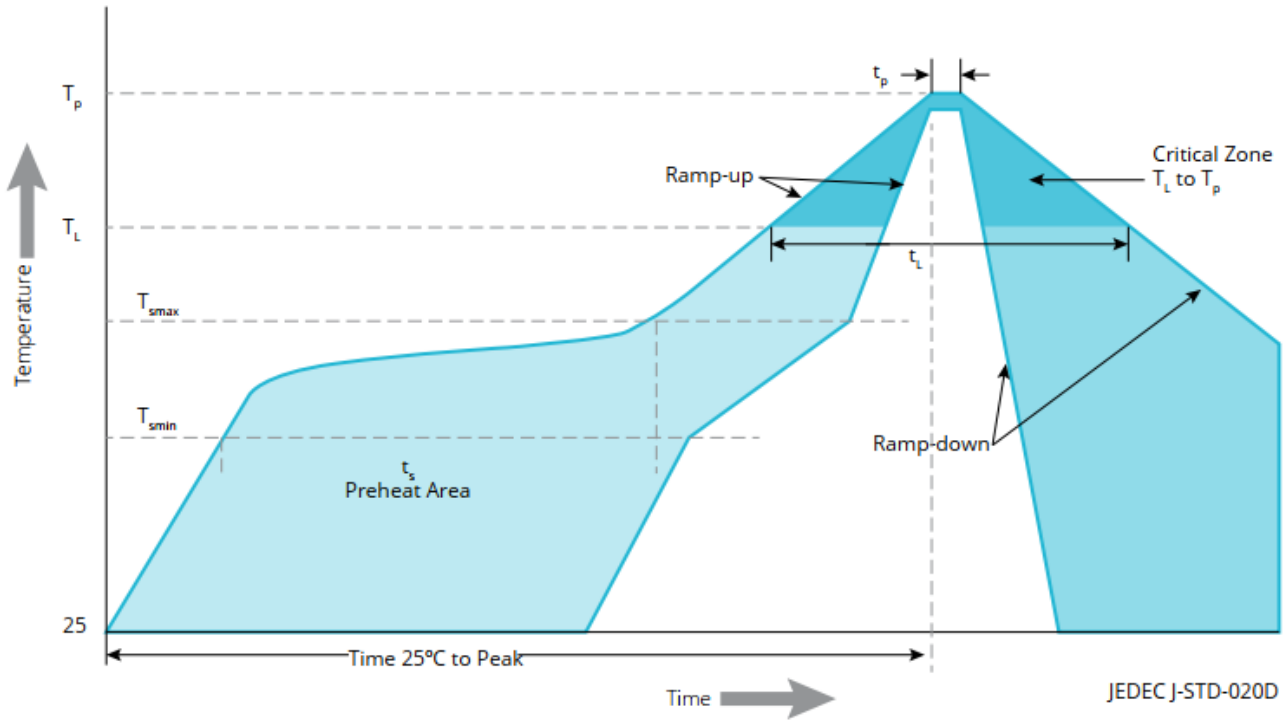
Reflow Soldering Guidelines



Visualization of the acceptable reflow temperature profile as specified

Reflow profile characteristics for Queendom smd.

PROFILE FEATURE	LEAD-FREE ASSEMBLY
Preheat Minimum Temperature (T_{smin})	150°C
Preheat Maximum Temperature (T_{smax})	200°C
Preheat Time (t_{smin} to t_{smax})	60 to 120 seconds
Ramp-Up Rate (T_L to T_p)	4°C / second maximum
Liquidous Temperature (T_L)	217°C
Time Maintained Above Temperature T_L (t_L)	60 to 150
seconds Peak / Classification Temperature (T_p)	250°C
Time Within 5°C of Actual Peak Temperature (t_p)	20 to 40 seconds
Ramp-Down Rate (T_p to T_L)	6°C / second maximum maximum
Time 25°C to Peak Temperature	8 minutes maximum

JEDEC Moisture Sensitivity

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
5a	24 hours	≤30°C / 60% RH	48 Hours +2/ -0	30°C / 60% RH

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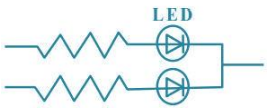
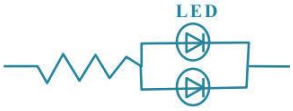
Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



Circuit model B



Recommended circuit
The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

Repairing
Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:
Use a conductive wrist band or anti- electrostatic glove when handling these LEDs.
All devices, equipment, and machinery must be properly grounded.
Work tables, storage racks, etc. should be properly grounded.
Use ion blower to neutralize the static charge which might have built up on surface of the LEDs plastic lens as a result of friction between LEDs during storage and handing.

Others

The information included in this document reflects representative usage scenarios and is intended for technical reference only.
The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Queendom will not be responsible for any subsequent issues.
The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Queendom's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health, such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices.

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